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10/521,691	08/31/2005	Masayasu Okochi	10873.1604USWO	4565
52835 7590 01/07/2009 HAMRE, SCHUMANN, MUELLER & LARSON, P.C. P.O. BOX 2902			EXAMINER	
			BUNNER, BRIDGET E	
MINNEAPOLI	MINNEAPOLIS, MN 55402-0902		ART UNIT	PAPER NUMBER
			1647	
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# Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/521,691	OKOCHI ET AL.
Office Action Summary	Examiner	Art Unit
	Bridget E. Bunner	1647
The MAILING DATE of this communication app Period for Reply	pears on the cover sheet with the o	correspondence address
A SHORTENED STATUTORY PERIOD FOR REPL WHICHEVER IS LONGER, FROM THE MAILING D  - Extensions of time may be available under the provisions of 37 CFR 1.1 after SIX (6) MONTHS from the mailing date of this communication.  - If NO period for reply is specified above, the maximum statutory period  - Failure to reply within the set or extended period for reply will, by statute Any reply received by the Office later than three months after the mailin earned patent term adjustment. See 37 CFR 1.704(b).	ATE OF THIS COMMUNICATION (136(a). In no event, however, may a reply be ting will apply and will expire SIX (6) MONTHS from (e, cause the application to become ABANDONE)	N. nely filed the mailing date of this communication. D (35 U.S.C. § 133).
Status		
Responsive to communication(s) filed on <u>20 C</u> This action is <b>FINAL</b> . 2b) ☐ This action is <b>FINAL</b> .      Since this application is in condition for alloware closed in accordance with the practice under <i>B</i> .	s action is non-final. nce except for formal matters, pro	
Disposition of Claims		
<ul> <li>4)  Claim(s) 1-3 and 6-21 is/are pending in the ap 4a) Of the above claim(s) is/are withdra</li> <li>5)  Claim(s) is/are allowed.</li> <li>6)  Claim(s) is/are rejected.</li> <li>7)  Claim(s) is/are objected to.</li> <li>8)  Claim(s) 1-3, 6-21 are subject to restriction an</li> </ul>	wn from consideration.	
Application Papers		
9) The specification is objected to by the Examine 10) The drawing(s) filed on is/are: a) accomposed applicant may not request that any objection to the Replacement drawing sheet(s) including the correct 11) The oath or declaration is objected to by the Examine 11.	cepted or b) objected to by the liderawing(s) be held in abeyance. See tion is required if the drawing(s) is objected.	e 37 CFR 1.85(a). jected to. See 37 CFR 1.121(d).
Priority under 35 U.S.C. § 119		
12) ☐ Acknowledgment is made of a claim for foreign a) ☐ All b) ☐ Some * c) ☐ None of:  1. ☐ Certified copies of the priority document 2. ☐ Certified copies of the priority document 3. ☐ Copies of the certified copies of the priority application from the International Burea * See the attached detailed Office action for a list	ts have been received. ts have been received in Applicati rity documents have been receive u (PCT Rule 17.2(a)).	on No ed in this National Stage
Attachment(s)  1) Notice of References Cited (PTO-892)  2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  3) Information Disclosure Statement(s) (PTO/SB/08)  Paper No(s)/Mail Date	4)  Interview Summary Paper No(s)/Mail Da 5)  Notice of Informal F 6) Other:	ate

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#### **DETAILED ACTION**

## Status of Application, Amendments and/or Claims

The amendment of 20 October 2008 has been entered in full. Claims 1, 6, 7, 13, 15 are amended. Claims 19-21 are added.

Claims 1-3, 6-21 are pending in the instant application.

#### Election/Restrictions

After consideration of Applicant's amended and newly added claims submitted on 20 October 2008, the restriction requirement set forth between *claims* 1-5 and 6-11 only in the communication of 05 March 2008 is hereby withdrawn.

However, in view of the numerous SEQ ID NOs recited in the amended claims and in non-elected Groups II-XIX of the original restriction requirement of 05 March 2008, a subsequent restriction election is required.

### REQUIREMENT FOR UNITY OF INVENTION

As provided in 37 CFR 1.475(a), a national stage application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept ("requirement of unity of invention"). Where a group of inventions is claimed in a national stage application, the requirement of unity of invention shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features. The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art.

The determination whether a group of inventions is so linked as to form a single general inventive concept shall be made without regard to whether the inventions are claimed in separate claims or as alternatives within a single claim. See 37 CFR 1.475(e).

## When Claims Are Directed to Multiple Categories of Inventions:

As provided in 37 CFR 1.475(b), a national stage application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the following combinations of categories:

- (1) A product and a process specially adapted for the manufacture of said product; or
- (2)A product and process of use of said product; or

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(3)A product, a process specially adapted for the manufacture of the said product, and a use of the said product; or

- (4)A process and an apparatus or means specifically designed for carrying out the said process; or
- (5)A product, a process specially adapted for the manufacture of the said product, and an apparatus or means specifically designed for carrying out the said process.

Otherwise, unity of invention might not be present. See 37 CFR 1.475(c).

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

- Group 1. Claims 1-3, 6-11, 19-20, drawn to an isolated or synthesized Notch fragment polypeptide comprising an amino acid sequence of SEQ ID NO: 1.
- Groups 2-18. Claims 1-3, 6-11, 19-20, drawn to an isolated or synthesized Notch fragment polypeptide comprising one amino acid sequence selected from the group consisting of SEQ ID NOs: 2-18. For example, if Group 3, is elected, the claims will be searched to the extent that they read upon SEQ ID NO: 3.
- Groups 19-26. Claims 1-3, 21, drawn to an isolated or synthesized Notch fragment polypeptide comprising an amino acid sequence consisting of the 1<sup>st</sup> residue to the 8<sup>th</sup> residue of SEQ ID NOs: 37 or 38 or an amino acid sequence consisting of the 1<sup>st</sup> residue to the 6<sup>th</sup> residue of SEQ ID NOs: 39-44. For example, if Group 20 is elected, the claims will be searched to the extent that they read upon an amino acid sequence consisting of the 1<sup>st</sup> residue to the 8<sup>th</sup> residue of SEQ ID NO: 38.

The groups of inventions listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Groups 1-26 lack unity of invention because the groups do not share the same or corresponding technical feature. For example, the amino acid sequences of Groups 1-26 are composed of different amino acids and are structurally and functionally unrelated to each other. Accordingly, each of the 26 different amino acid sequences are not so linked under PCT Rule 13.1 and are thus placed in 26 different inventive Groups numbered 1-26, respectively. Additionally, SEQ ID NO: 1 is anticipated by prior art. Amino acid residues 1711-1731 of Genbank Accession No. Q01705 are 100% identical to amino acids 1-21 of SEQ ID NO: 1 of the instant application (see sequence alignment attached to the instant Office Action as Appendix A). Therefore, the amino acid sequence of SEQ ID NO: 1 lacks a special technical feature.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention or species.

Should applicant traverse on the ground that the inventions have unity of invention (37 CFR 1.475(a)), applicant must provide reasons in support thereof. Applicant may submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. Where such evidence or admission is provided by applicant, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

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Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bridget E. Bunner whose telephone number is (571) 272-0881. The examiner can normally be reached on 8:30-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manjunath Rao can be reached on (571) 272-0939. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BEB Art Unit 1647 02 January 2009

> /Bridget E Bunner/ Primary Examiner, Art Unit 1647

# Appendix A

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NOTC1 MOUSE
     NOTC1 MOUSE
                                                2531 AA.
ID
                              Reviewed;
     Q01705; Q06007; Q61905; Q99JC2; Q9QW58; Q9R0X7;
     01-NOV-1995, integrated into UniProtKB/Swiss-Prot. 01-FEB-1996, sequence version 2.
DΤ
     24-JUL-2007, entry version 92.
DE
    Neurogenic locus notch homolog protein 1 precursor (Notch 1) (Motch A)
     (mT14) (p300) [Contains: Notch 1 extracellular truncation; Notch 1
DE.
     intracellular domain].
GN
    Name=Notch1; Synonyms=Motch;
OS
     Mus musculus (Mouse).
     Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC
    Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Sciurognathi;
OC
OC
     Muroidea; Muridae; Murinae; Mus.
     NCBI TaxID=10090;
RN
     [1]
RP
     NUCLEOTIDE SEQUENCE [MRNA] (ISOFORM 1).
     TISSUE=Embryo;
RC
     MEDLINE=93194170; PubMed=8449489; DOI=10.1006/geno.1993.1055;
RX
RA
     Franco del Amo F., Gendron-Maguire M., Swiatek P.J., Jenkins N.A.,
     Copeland N.G., Gridley T.;
RA
     "Cloning, analysis, and chromosomal localization of Notch-1, a mouse
     homolog of Drosophila Notch.";
RТ
     Genomics 15:259-264(1993).
RN
     [2]
RP
     NUCLEOTIDE SEQUENCE [MRNA] OF 731-1899 (ISOFORM 2), AND DEVELOPMENTAL
RP
     STAGE.
RC.
     STRAIN=CD-1; TISSUE=Embryo;
     MEDLINE=93050801; PubMed=1426644; DOI=10.1016/0012-1606(92)90076-S;
RA
     Reaume A.G., Conlon R.A., Zirngibl R., Yamaguchi T.P., Rossant J.;
     "Expression analysis of a Notch homologue in the mouse embryo.";
     Dev. Biol. 154:377-387(1992).
RT.
RN
     NUCLEOTIDE SEQUENCE [MRNA] OF 1551-1647 (ISOFORM 1), AND DEVELOPMENTAL
RΡ
RP
     STAGE.
RC
     TISSUE=Embryo;
     MEDLINE=93048835; PubMed=1425352;
RX
     Franco del Amo F., Smith D.E., Swiatek P.J., Gendron-Maguire M.,
     Greenspan R.J., McMahon A.P., Gridley T.; "Expression pattern of Motch, a mouse homolog of Drosophila Notch,
RA
RT
RT
     suggests an important role in early postimplantation mouse
RT
     development.";
     Development 115:737-744(1992).
RT.
RN
     ۲41
     NUCLEOTIDE SEQUENCE [MRNA] OF 1161-1547.
     STRAIN=C57BL/6 X CBA; TISSUE=Embryo;
RC.
RX
     MEDLINE=93178563; PubMed=8440332; DOI=10.1006/excr.1993.1044;
RA
     Lardelli M., Lendahl U.;
RT
     "Motch A and Motch B-two mouse Notch homologues coexpressed in a wide
RT
     variety of tissues.";
     Exp. Cell Res. 204:364-372(1993).
RL
     NUCLEOTIDE SEQUENCE [MRNA] OF 1659-1673.
RP
RX
     MEDLINE=99364499; PubMed=10437788; DOI=10.1016/S0014-5793(99)00901-1;
RA
     Lee J.S., Ishimoto A., Yanagawa S.;
RT
     "Murine leukemia provirus-mediated activation of the Notch1 gene leads
RТ
     to induction of HES-1 in a mouse T lymphoma cell line, DL-3.";
RT.
     FEBS Lett. 455:276-280(1999).
     NUCLEOTIDE SEQUENCE [MRNA] OF 1950-2201.
RP
     MEDLINE=98029496; PubMed=9384671;
```

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Messerle M., Follo M., Nehls M., Eggert H., Boehm T.;
     "Dynamic changes in gene expression during in vitro differentiation of
RT
     mouse embryonic stem cells.";
    Cytokines Cell. Mol. Ther. 1:139-143(1995).
RT.
RN
RΡ
    PROTEIN SEQUENCE OF 1655-1659, CLEAVAGE BY FURIN-LIKE CONVERTASE, AND
RP
    MUTAGENESIS OF 1651-ARG--ARG-1654.
RX MEDLINE=98318619; PubMed=9653148; DOI=10.1073/pnas.95.14.8108;
RA
    Logeat F., Bessia C., Brou C., LeBail O., Jarriault S., Seidah N.G.,
RA
     Israel A.;
     "The Notch1 receptor is cleaved constitutively by a furin-like
RТ
RТ
     convertase.";
RL
     Proc. Natl. Acad. Sci. U.S.A. 95:8108-8112(1998).
RN
RΡ
    NUCLEOTIDE SEQUENCE [MRNA] OF 1865-2075, AND DEVELOPMENTAL STAGE IN
    HAIR FOLLICLES.
RP
     PubMed=8486742; DOI=10.1083/jcb.121.3.631;
RX
    Kopan R., Weintraub H.;
RA
    "Mouse notch: expression in hair follicles correlates with cell fate
RT
RТ
    determination.";
RT.
    J. Cell Biol. 121:631-641(1993).
RN
     [9]
     PARTIAL PROTEIN SEQUENCE, AND PROTEOLYTIC PROCESSING.
RP
    MEDLINE=21523956; PubMed=11518718; DOI=10.1074/jbc.M107234200;
RX
     Saxena M.T., Schroeter E.H., Mumm J.S., Kopan R.;
RA
RT
     "Murine notch homologs (N1-4) undergo presenilin-dependent
RT
    proteolysis.";
RL
     J. Biol. Chem. 276:40268-40273(2001).
RN
     [10]
     PROTEOLYTIC PROCESSING.
RP
     MEDLINE=21374376; PubMed=11459941; DOI=10.1073/pnas.161269998;
RX
    Mizutani T., Taniguchi Y., Aoki T., Hashimoto N., Honjo T.;
RA
     "Conservation of the biochemical mechanisms of signal transduction
RT
     among mammalian Notch family members.";
RT
RT.
     Proc. Natl. Acad. Sci. U.S.A. 98:9026-9031(2001).
RN
     [11]
     INTERACTION WITH DTX1 AND DTX2.
RP
RX
     MEDLINE=21123790; PubMed=11226752; DOI=10.1016/S0736-5748(00)00071-X;
     Kishi N., Tang Z., Maeda Y., Hirai A., Mo R., Ito M., Suzuki S.,
RA
    Nakao K., Kinoshita T., Kadesch T., Hui C.-C., Artavanis-Tsakonas S.,
     Okano H., Matsuno K.;
RA
     "Murine homologs of deltex define a novel gene family involved in
RT
     vertebrate Notch signaling and neurogenesis.";
     Int. J. Dev. Neurosci. 19:21-35(2001).
RL
RN
     [12]
     INTERACTION WITH MAML1.
RP
     PubMed=15019995; DOI=10.1016/j.gene.2003.12.007;
     Wu L., Kobayashi K., Sun T., Gao P., Liu J., Nakamura M., Weisberg E.,
RA
RA
    Mukhopadhyay N.K., Griffin J.D.;
RТ
     "Cloning and functional characterization of the murine mastermind-like
RT
    1 (Maml1) gene.";
RT.
    Gene 328:153-165(2004).
RN
     [13]
     INTERACTION WITH DNER, FUNCTION, AND TISSUE SPECIFICITY.
RP
     PubMed=15965470; DOI=10.1038/nn1492;
RX
     Eiraku M., Tohgo A., Ono K., Kaneko M., Fujishima K., Hirano T.,
RA
RA
     Kengaku M.:
RT
     "DNER acts as a neuron-specific Notch ligand during Bergmann glial
RT
    development.";
    Nat. Neurosci. 8:873-880(2005).
RT.
    X-RAY CRYSTALLOGRAPHY (2.2 ANGSTROMS) OF 1970-2104.
RP
RX
     PubMed=15802643; DOI=10.1110/ps.041184105;
RA
     Lubman O.Y., Kopan R., Waksman G., Korolev S.;
RT
     "The crystal structure of a partial mouse Notch-1 ankyrin domain:
RT
     repeats 4 through 7 preserve an ankyrin fold.";
     Protein Sci. 14:1274-1281(2005).
RT.
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-!- FUNCTION: Functions as a receptor for membrane-bound ligands Jagged1, Jagged2 and Delta1 to regulate cell-fate determination. Upon ligand activation through the released notch intracellular domain (NICD) it forms a transcriptional activator complex with RBP-J kappa and activates genes of the enhancer of split locus. Affects the implementation of differentiation, proliferation and apoptotic programs (By similarity). May play an essential role in postimplantation development, probably in some aspect of cell specification and/or differentiation. May be involved in mesoderm development, somite formation and neurogenesis. Involved in the maturation of both CD4+ and CD8+ cells in the thymus. Important for follicular differentiation and possibly cell fate selection within the follicle. During cerebellar development, functions as a receptor for neuronal DNER and is involved in the differentiation of Bergmann glia.
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- -!- SUBUNIT: Heterodimer of a C-terminal fragment N(TM) and an N-terminal fragment N(EC) which are probably linked by disulfide bonds. Interacts with DNER, DTX1, DTX2 and RBPSUH. Also interacts with MAML1, MAML2 and MAML3 which act as transcriptional coactivators for NOTCH1.
- -!- SUBCELLULAR LOCATION: Cell membrane; Single-pass type I membrane protein. NICD: Nucleus. Note=Following proteolytical processing NICD is translocated to the nucleus.
- -!- ALTERNATIVE PRODUCTS:

Event=Alternative splicing; Named isoforms=2;

Name=1;

IsoId=Q01705-1; Sequence=Displayed;

CC Name=2;

IsoId=Q01705-2; Sequence=VSP\_001402, VSP\_001403, VSP\_001404;
Note=No experimental confirmation available;

- -!- TISSUE SPECIFICITY: Highly expressed in the brain, lung and thymus. Expressed at lower levels in the spleen, bone-marrow, spinal cord, eyes, mammary gland, liver, intestine, skeletal muscle, kidney and heart. In the hair follicle, highly expressed exclusively in the epithelial compartment.
- -!- DEVELOPMENTAL STAGE: First detected in the mesoderm at 7.5 dpc By 8.5 dpc highly expressed in presomitic mesoderm, mesenchyme and endothelial cells, while much lower levels are seen in the neuroepithelium. Between 9.5-10.5 dpc expressed at high levels in the neuroepithelium. At 13.5 dpc expressed in the surface ectoderm, eye and developing whisker follicles. Hair follicle matrix cells expression starts as different cell types become distinguishable in the developing follicle. Expression persists throughout the growth phase of the follicle and maintains the same expression profile in the second hair cycle. The cells in the follicle that undergo a phase of high level expression are in transition from mitotic precursors to several discrete, differentiating cell types. Specifically expressed in cerebellar Bergmann glial cells during post-natal development.
- -!- PTM: Synthesized in the endoplasmic reticulum as an inactive form which is proteolytically cleaved by a furin-like convertase in the trans-Golgi network before it reaches the plasma membrane to yield an active, ligand-accessible form. Cleavage results in a C-terminal fragment N(TM) and a N-terminal fragment N(EC). Following ligand binding, it is cleaved by TNF-alpha converting enzyme (TACE) to yield a membrane-associated intermediate fragment called notch extracellular truncation (NEXT). This fragment is then cleaved by presenilin dependent gamma-secretase to release a notch-derived peptide containing the intracellular domain (NICD) from the membrane.
- -!- PTM: Phosphorylated.
- -!- SIMILARITY: Belongs to the NOTCH family.
- -!- SIMILARITY: Contains 5 ANK repeats.
- -!- SIMILARITY: Contains 36 EGF-like domains.
- CC -!- SIMILARITY: Contains 3 LNR (Lin/Notch) repeats.
- CC Copyrighted by the UniProt Consortium, see http://www.uniprot.org/terms